"HST Observations of the Disks and Jets of Taurus Young Stellar Objects"
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by Dr. Karl Stapelfeldt, WFPC2 Science Group

We report on Hubble Space Telescope Wide Field and Planetary Camera 2 observations of eleven young stellar objects in the nearby Taurus molecular clouds. The high spatial resolution and stable point spread function of HST reveal new details of the circumstellar envelopes, disks, and jets of these objects. HL Tauri is visible primarily as scattered light within its blueshifted outflow cavity. XZ Tauri has an associated bubble of emission nebulosity which may enclose a Herbig-Haro jet. T Tauri lies close to an arc of reflection nebulosity suggestive of a cleared outflow cavity. The binary FS Tauri lies within a complex reflection nebula which may be a bipolar outflow cavity. For DG Tauri the star is directly visible adjacent to two or three nested arcs of reflection nebulosity; the jet is well-resolved with a knot morphology suggestive of internal bow shocks. GM Aurigae exhibits a flattened reflection nebula which is well-aligned with its molecular gas disk. Two weak-line T Tauri stars (SAO 76411A and HDE 283572) show no evidence for circumstellar nebulosity.

Of greatest interest are three jet sources which appear only as bipolar nebulosities at visible wavelengths. In HH 30, FS Tau B, and DG Tau B, the ionized jets are remarkably narrow (FWHM <50 AU) with interknot spacings that correspond to dynamical timescales of less than 10 years. The reflected light in DG Tau B extends along the jet axis, suggesting scattering within a cleared cavity in the circumstellar envelope. In FS Tau B and HH 30, however, the reflected light has greater extent perpendicular to the jet axis. We interpret this as scattering at the upper and lower surfaces of flared, optically thick circumstellar disks. Model reflection nebulae calculated for disk density distributions are a good match to the HH 30 images. The HH 30 disk is 450 AU in diameter, has a mass of about 0.001 Msun, has a scale height of 15 AU at a radius of 100 AU, and is significantly more flared than predicted for a steady-state accretion disk in vertical hydrostatic equilibrium. The estimated mass accretion rates indicate that the HH 30 disk should be consumed in just 10^5 years.

OVRO Millimeter Array maps of HH 30 and plans for future T Tauri star studies with HST will also be discussed.